

<b>Biology</b>	<b>Group-I</b>	<b>Paper-I</b>
<b>Time: 1.45 Hours</b>	<b>(Subjective Type)</b>	<b>Marks: 48</b>

**(Part-I)**

**Q.2. Write short answers to any FIVE (5) questions: (10)**

**(i) Define physiology and anatomy.**

**Ans** **Physiology:** *Unit #1*

This branch deals with the study of the functions of different parts of living organisms.

**Anatomy:**

The study of internal structures is called anatomy.

**(ii) Define population and community.**

**Ans** **Population:**

A population is defined as "A group of organisms of the same species located at the same place, in the same time."

For example, human population in Pakistan in 2010 comprises of 173.5 million individuals. (According to the Ministry of Population Welfare. Government of Pakistan.)

**Community:**

"Community is an assemblage of different populations, interacting with one another within the same environment."

A forest may be considered as a community. It includes different plant, microorganisms, fungi and animal species.

**(iii) What is the difference between ratio and proportion?**

**Ans** **Difference between Ratio and Proportion**



Ratio	Proportion
1- When a relation between two numbers e.g., 'a' and 'b' is expressed in terms of quotient ( $a/b$ ), it is called the ratio of one number to the other.	Proportion means to join two equal ratios by the sign of equality ( $=$ ).
2. For example, the ratio between 50 malarial patients and 150 normal persons is 1:3.	For example, $a:b=c:d$ is a proportion between the two ratios.
3. Ratio may be expressed by putting a division (+) or colon (:) mark between the two numbers.	Proportion may also be expressed as $a:b::c:d$ .

Unit #2

(iv) Write down any two characteristics of hypothesis.

**Ans** Following are two characteristics of good hypothesis:

- 1- It should be a general statement. \*
- 2- It should be a tentative idea.

(v) Define deforestation and write its causes.

**Ans** Deforestation means cutting down of trees for the conversion of a forest to non-forest land.

**Causes:**

Sometime there is slow forest degradation and sometime sudden and catastrophic clear-cutting for urban development. Deforestation can be the result of deliberate removal of forests for wood, agriculture or urban development.

(vi) Write any two characteristics of organisms of kingdom monera. \*

**Ans** Following are two characteristics of organisms of kingdom monera:

Unit #3



1. It includes prokaryotic organisms i.e., they are made of prokaryotic cells form chains, clusters, or colonies of cells.
2. They are unicellular, although some types.

(vii) Describe briefly sclerenchyma tissues.

**Ans** Sclerenchyma Tissue: ✖

Unit #4

They are composed of cells with rigid secondary cell walls. Their cell walls are hardened with lignin, which is the main chemical component of wood. Mature sclerenchyma cells cannot elongate and most of them are dead.

(viii) Define hypotonic and hypertonic solutions. ✖

**Ans** A hypotonic solution has relatively less solute. While a hypertonic solution has relatively more solute.

**Q.3. Write short answers to any FIVE (5) questions: (10)**

(i) Differentiate between chromatin and chromosomes.

**Ans**

•Pk

Chromosomes	Chromatin
Chromosomes are composed of DNA and protein. They are visible only during cell division.	During interphase of cell, chromosomes are in the form of fine thread-like structures known as chromatin.

(ii) How cytokinesis takes place in plants' cells? ✖

**Ans** Cytokinesis in plant cells occurs differently. Vesicles derived from the Golgi apparatus move to the middle of cell and fuse to form a membrane-bounded disc called cell plate or phragmoplast. The plate grows outward and more vesicles fuse with it. Finally, membranes of cell plate fuse with plasma membrane and its contents join the



parental cell wall. The result is two daughter cells, each bounded by its own plasma membrane and cell wall.

(iii) When and who discovered meiosis? Unit #5

**Ans** Meiosis was discovered and described for the first time in 1876, by a German biologist **Oscar Hertwig**.

(iv) What is meant by metabolism? Who first of all gave the concept of metabolism? Unit #6

**Ans** Metabolism is the set of biochemical reactions that occur in living organisms in order to maintain life. The term metabolism is derived from a Greek word meaning "change". The concept of metabolism was first of all given by Ibn-e-Nafees, who stated that "the body and its parts are always undergoing change".

(v) Describe metabolic pathways.

**Ans** Several enzymes can work together in a specific order, creating metabolic pathways.

In a metabolic pathway, one enzyme takes the product of another enzyme as a substrate. After the reaction, the product is passed on to the next enzyme.

(vi) What is glycolysis?

**Ans** Glycolysis occurs in cytoplasm and oxygen is not involved in this stage. That is why, it occurs in both types of respiration i.e., aerobic and anaerobic. In glycolysis, glucose (6C) molecule is broken into two molecules of pyruvic acid (3C).

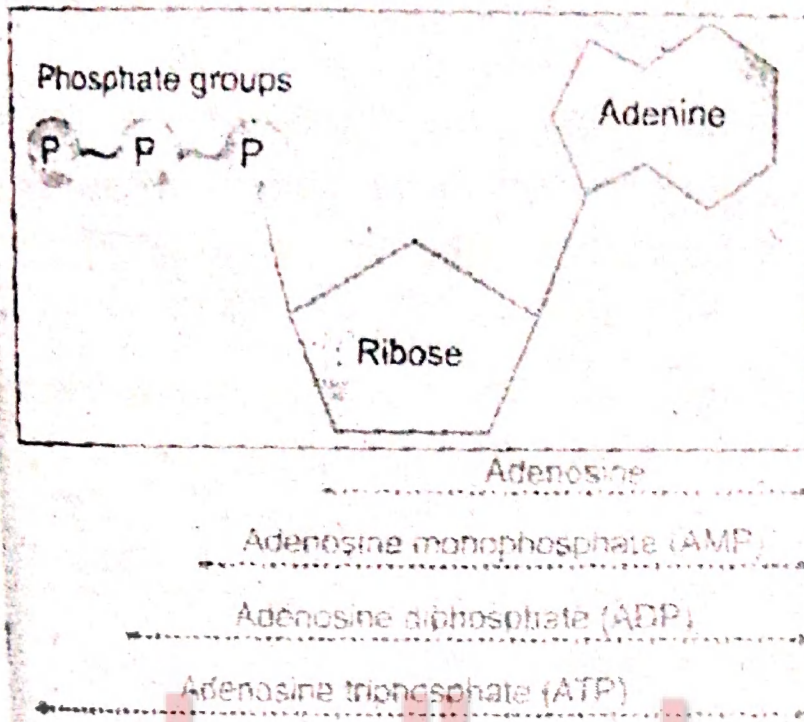
(vii) What are anaerobes? Write two examples.

**Ans** When free oxygen is available, some organisms including some bacteria and some fungi get energy from anaerobic respiration and are called anaerobes.



(viii) Sketch molecular structure of adenosine triphosphate. ✕ Unit #7

**Ans**



**Q.4. Write short answers to any FIVE (5) questions: (10)**

(i) Define scurvy. Write its two symptoms. ✕

**Ans** The disease known as scurvy results from lack of vitamin C. In this condition, the synthesized collagen is unstable. Symptoms of scurvy include muscle and joint pain, swollen and bleeding gums, slow wounds healing, and dry skin. Unit #8

(ii) How does iodine function in our body? ✕

**Ans** Iodine is essential for normal thyroid function.

(iii) What is the function of pepsin in stomach? ✕

**Ans** Pepsin partially digests the protein portion of food (bulk of mutton) into polypeptides and shorter peptide chains.

(iv) Write down four causes of ulcer. ✕

**Ans** The causes of ulcer include excess acid, infection, long-term use of anti-inflammatory medicines (including



aspirin), smoking, drinking coffee, colas, and eating spicy foods.

(v) How transpiration rate affects when air movement changes?

**Ans** Wind carries away the evaporated water from leaves and it carries an increase in the rate of evaporation from the surface of mesophyll cells. When air is still, the rate of transpiration is reduced.

(vi) Write down four name of human heart chambers.

**Ans** The names of human heart chambers are as follows:

1. Right atrium                      2. Left atrium
3. Right ventricle                  4. Left ventricle

(vii) How pus is produced?

**Ans** White blood cells die in the process of killing the germs. These dead cells accumulate and make the white substance called pus, seen at infection sites.

(viii) Write down two symptoms of dengue fever.

**Ans** In dengue fever, there is a sharp decrease in the number of platelets in blood. Because of this, patients bleed from the nose, gums and under the skin.

### (Part-II)

**Note:** Attempt any TWO (2) questions.

**Q.5.(a) Explain the relationship of biology to any other four sciences. (4)**

**Ans** **Relationship of Biology to Other Sciences:**

The interrelationship among different branches of science cannot be denied. Biology includes information on various aspects of living things but these information relate to the other branches of science as well. Each branch of science has relationship with all other branches. For example, when studying the process of movement in



animals, the biologists have to refer to the laws of motion in physics. This forms the basis of interdisciplinary sciences.

**(i) Biochemistry:**

It deals with the study of the chemistry of different compounds and processes occurring in living organisms. For example, the study of basic metabolism of photosynthesis and respiration involves the knowledge of chemistry.

**(ii) Biomathematics / Biometry:**

It deals with the study of biological processes using mathematical techniques and tools. For example, to analyze the data gathered after experimental work, biologists have to apply the rules of mathematics.

**(iii) Biogeography:**

It deals with the study of the occurrence and distribution of different species of living organisms in different geographical regions of the world. It applies the knowledge of the characteristics of particular geographical regions to determine the characteristics of living organisms found there.

**(iv) Bioeconomics:**

It deals with the study of organisms from economical point of view. For example, the cost value and profit value of the yield of wheat can be calculated through bioeconomics and benefits or losses can be determined.

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**(b) Describe five differences between prokaryotic and eukaryotic cells. (5)**

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**Ans** For Answer see Paper 2016 (Group-I), Q.5.(b).

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**Q.6.(a) Describe the Lock and Key Model of mechanism of enzyme action. (4)**

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**Ans** For Answer see Paper 2017 (Group-II), Q.6.(a).

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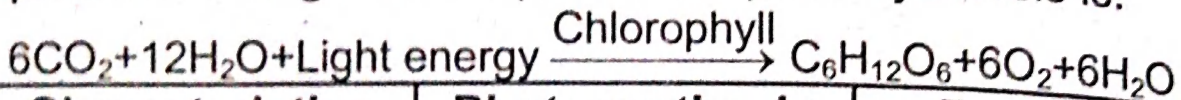
**(b) What do you mean by photosynthesis? Describe difference between photosynthesis and respiration. (5)**

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**Ans** **Photosynthesis:**

Photosynthesis is the synthesis of glucose from carbon dioxide and water in the presence of sunlight and chlorophyll. The oxygen is released as a by-product in this process. The general equation for photosynthesis is:



Characteristics	Photosynthesis	Respiration
Metabolism	Anabolism	Catabolism
Energy investment / production:	Investment of light energy to store it in the form of bond energy.	Bond energy transformed into chemical energy of ATP.
Organisms capable of:	Some bacteria, all algae all plants.	All organisms.
Site of occurrence:	Chloroplasts.	In cytoplasm and mitochondria.
Time of occurrence:	In daytime only, in the presence of light.	All the time.

**Q.7.(a) Describe mineral deficiency diseases. (4)****Ans** **Mineral Deficiency Diseases:**

Diseases resulting from the deficiency of a mineral are relatively rare among humans. Some examples are given below:

- 1- **Goiter** is a condition caused by an insufficient amount of iodine in diet. Iodine is used by thyroid gland to produce hormones that control the body's normal functioning and growth. If sufficient iodine is not available in a person's diet, thyroid gland becomes enlarged and it results in swelling in neck. This condition is known as goitre.
- 2- **Anaemia** is the most common of all mineral deficiency diseases. The term anaemia literally means "a lack of blood." It is caused when the number of red blood cells is reduced than the



normal. Haemoglobin molecule contains a single atom of iron at its centre. If body fails to receive sufficient amounts of iron, adequate number of haemoglobin molecules are not formed. In this case, there are not enough functioning of red blood cells. The patient is weak and there is shortage of oxygen supply to body's cells.

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- (b) What do you mean by blood groups? How do we classify blood groups in terms of ABO and Rh blood group systems? (5)
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**Ans** Blood group systems:

Blood group systems are a classification of blood based on the presence or absence of antigens on the surface of red blood cells. An **antigen** is a molecule that can stimulate an immune response (antibody production etc.).

**ABO Blood Group System:**

It is the most important blood group system in humans. It was discovered by the Austrian scientist Karl Landsteiner, who found four different blood groups (blood types) in 1900. He was awarded the Nobel Prize in Medicine for his work.

In this system, there are four different blood groups which are distinct from each other on the basis of specific antigens (antigen A and B) present on the surface of RBCs. A person having antigen A has blood group A, a person having antigen B has blood group B, a person having both antigens has blood group AB, and a person having none of the A and B antigens has blood group O.

After birth, two types of antibodies *i.e.*, anti-A & anti-B antibodies appear in the blood serum of individuals. These antibodies are present according to the absence of corresponding antigen. In persons with blood group A, antigen A is present and antigen B is absent. So their blood will contain anti-B antibodies. In persons with blood



group B, antigen B is present and antigen A is absent. So their blood will contain anti-A antibody. In persons with blood group AB, antigens A & B are present *i.e.*, neither is absent. So their blood serum will contain no antibody. In persons with blood group O, neither antigen A nor antigen B is present *i.e.*, both are absent. So their blood serum will contain both antibodies *i.e.*, anti-A & anti-B.

### **Rh blood group system:**

In 1930's, Karl Landsteiner discovered the Rh-blood system. In this system, there are two blood groups *i.e.*, Rh-positive and Rh-negative. These blood groups are distinct from each other on the basis of antigens called Rh factors (first discovered in Rhesus monkey), present on the surface of RBCs. A person having Rh factors has blood group Rh-positive while a person not having Rh factors has blood group Rh-negative. Unlike the naturally occurring anti-A & anti-B antibodies of the ABO-system, an Rh-negative person does not produce anti-Rh antibodies unless Rh-factor enters in his / her blood.